

Claims

1-91. Canceled

92. (New) A method comprising displaying an image of at least one cable in a head-up display of a motor vehicle, the cable being superimposed over a view of a landscape in such a way that the cable appears to an observer of the image of the cable from within the vehicle to be a real object existing in the landscape higher than the head of the observer.

93. (New) The method of claim 92 wherein the cable is displayed to the observer volumetrically and with continuous depth.

94. (New) The method of claim 92 wherein the cable appears to the observer to be extending out in front of, and away from, the vehicle at a height of about 3 – 20 meters above the surface of the landscape, said height being substantially uniform at any particular point in time, including where the surface of the landscape is other than substantially flat.

95. (New) The method of claim 92 wherein the image of the cable is displayed to the observer with an optic flow that is consistent with the optic flow of the landscape when the vehicle is moving.

96. (New) The method of claim 92 further comprising
determining a route for the vehicle,
computing data that controls the head-up display in such a way that the cable appears to the observer to be extending forwardly away from the vehicle on the route,
and

repeating the computing at successive time intervals in such a way that the cable appears to the observer to be substantially stationary relative to the landscape even when the vehicle is moving.

97. (New) The method of claim 96 wherein the route includes at least one roadway, and the cable appears to the observer to be at a substantially uniform distance above the surface of the roadway including where the surface of the roadway is other than substantially flat.

98. (New) The method of claim 97 wherein the cable appears to the observer to be in a substantially fixed relation to the roadway including where the roadway is other than straight.

99. (New) The method of claim 92 wherein the image of the cable is displayed with at least one of the depth cues: stereoscopic disparity, motion parallax, focus, convergence and dimming.

100. (New) The method of claim 96 wherein at at least a first point in time the image of the cable is displayed to the observer in such a way that the cable appears to the observer to be positioned aligned with the head of the observer even if the head of the observer is not on the route.

101. (New) The method of claim 100 wherein if the vehicle subsequently moves and the head of the observer remains out from under the apparent position of the cable for a selected period of time, the image of the cable is displayed to the observer such a way that the cable again appears to the observer to be positioned aligned with the head of the observer.

102. (New) The method of claim 92 wherein the cable is displayed without any accompanying images that correlate points on the cable with locations in the landscape.

103. (New) Apparatus for use in a motor vehicle that can travel on a roadway, the apparatus being adapted to indicate a route to a desired destination by displaying a virtual optical image seen by an operator of the vehicle substantially in front of the vehicle, wherein the virtual optical image is in a form of a luminous spot and wherein the virtual optical image moves along a three-dimensional path, said path being positioned at least in part substantially in front and above of the vehicle, from about 3 to 20 meters above the roadway and substantially parallel to the centerline of the roadway, and wherein the movement of the virtual optical image is sufficiently fast as to cause, because of the persistence of human vision, the virtual optical image to be perceived by the operator of the vehicle to be an extended object, extending along the path.

104. (New) The apparatus of claim 103 wherein the virtual optical image is produced periodically and frequently enough to cause the image perceived to be continuously present by the operator of the vehicle .

105. (New) The apparatus of claim 104 wherein the virtual optical image, in at least some part of its travel, traverses substantially the same virtual path relative to the roadway despite of the movement of the vehicle, thus to cause the image perceived by the operator of the vehicle to be stationary relative to the roadway.

106. (New) The apparatus of claim 103 wherein the virtual optical image is an image of a real light source presented through viewing optics of a display apparatus, said display apparatus being able to change the optical distance of the virtual optical image from the operator of the vehicle by continuously adjusting the position of the real light source in relation to said viewing optics of the optical apparatus.

107. (New) The apparatus of claim 106 wherein the viewing optics have an exit pupil large enough to accommodate both eyes of the operator of the vehicle.

108. (New) The method of claim 93 wherein the at least one cable comprises a line with non-closely-spaced gaps.

109. (New) The apparatus of claim 106 wherein the real light source is an illuminated spot created by shining a laser beam onto a diffusive screen, the laser beam being steerable under computer control in vector graphic mode, and wherein the adjusting the position of the real light source is effected through continuous actuation of the diffusive screen by an actuator steered in real time under computer control.

110. (New) A method of navigation of a motor vehicle traveling on a roadway, wherein a route to a desired destination is indicated by a virtual optical image seen by an operator of the vehicle substantially in front of the vehicle, wherein the virtual optical image is in the form of a line having a discernible width and having visibly well defined edges, the perceived width of the line by the operator of the vehicle being less than about 3 degrees of angle, wherein at least part of the line is presented as extending away from the operator in three dimensions, and wherein a portion of the line which is farther away from the operator than some other portion of the line has smaller angular thickness than that other portion of the line, substantially in agreement with laws of perspective.

111. (New) Apparatus adapted to display a luminous image of a cable on a head-up display within a vehicle in such a way that the image of the cable is superimposed over landscape viewed by an observer within the vehicle, the cable appearing to extend out in front of, and away from the vehicle, the cable appearing to be about between 3 to 20 meters above the surface of the landscape and to follow the surface underneath it vertically, the image of the cable being displayed with the depth cue of stereoscopic disparity and with the depth cue of motion parallax induced by head movements of the observer, and the image of the cable being displayed with an optic flow that is consistent with the optic flow of the landscape when the vehicle is moving, so as to cause the cable to appear to the observer to be substantially stationary relative to the landscape.